

Feb. 17, 2005 10:49AM

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Patent  
Attorney Docket No. GEGR8082.001

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of : Yudong Zhu  
Serial No. : 10/723,312  
Filed : November 26, 2003  
For : Method and Apparatus to Generate An RF Excitation  
Consistent With A Desired Excitation Profile Using  
A Transmit Coil Array  
Group Art No. : 2859  
Examiner : Shrivastav, B.

### CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

I hereby certify that, on the date shown below, this correspondence is being:

deposited with the US Postal Service in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

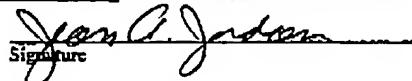
Mailing

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Transmission

transmitted by facsimile to Fax No.: 703-872-9306 addressed to Examiner Shrivastav at the Patent and Trademark Office.

Date: 2/17/05

  
Signature

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

### DECLARATION UNDER 37 C.F.R. §1.131

I, Yudong Zhu, being duly sworn, depose and say:

1. That I am the inventor for the above-identified Patent Application;
2. That I have reviewed the claims of this Application;
3. That I conceived in the United States, prior to August 20, 2002, the effective date of the cited reference, USP 6,828,790, the invention as set forth in the aforementioned claims, and

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Yudong Zhu

S/N: 10723,312

in particular, a process and system to determine a desired RF excitation profile and independently drive each transmit coil of a transmit coil array such that a collective excitation generated by the transmit coil array substantially matches the desired RF excitation profile.

4. Attached as Exhibited A is a copy of my disclosure letter titled "Method for Fast-Multi-Dimensional Excitation" to my employer that was prepared prior to August 20, 2002 evidencing conception of the above-captioned invention.

5. That from before August 20, 2002 to November 26, 2003, the filing date of the present application, I diligently worked toward reducing the above-captioned invention to practice and worked with patent counsel in the preparation of a patent application for the claimed invention.

That the statements made herein are of my own knowledge and are true and made on information and belief that are believed to be true.

I acknowledge that any willful false statements and the like made herein are punishable by fine or imprisonment, or both, and may jeopardize the validity of the application or any patent issuing thereon.

  
Yudong Zhu

Dated: Feb 16, 2005

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\*\*\*\*\*  
GE Confidential & Proprietary Information.  
This invention is being prepared for submission  
to the GE Patent And Legal Operation. Attorney  
work product may be contained herein.

\*\*\*\*\*

**GE Patent Disclosure Letter System****DOCKET NUMBER**

32052

**DOCKET DATE****TITLE OF INVENTION**

Method for Fast Multi-Dimensional Excitation

**GE TECHNOLOGY AREA(S)**

- GE Medical Systems (MSXX)

**PROJECT NAME**

32-Channel Systems

**PROJECT NUMBER**

2156191001

**PROJECT LEADER**

Kenwood, Gontran

**BUSINESS OR ORG. CONTACT INFORMATION**

NAME Bernstein, Tsuri

**PHONE NUMBER**

Was this invention first conceived or reduced to practice in  
the performance of work under a contract between GE and  
another non-government third party? NO

Date Invention Conceived : [REDACTED]

Circumstances Invention Conceived i.e., described in

patent notebook (include page #), technical report, letter, discussed in meeting minutes, etc.  
described in notebook

Was this invention first conceived or reduced to practice in the performance of work under a US Government contract?

NO

**ABSTRACT OF THE INVENTION**

Please write a brief explanation of the invention (Limit to 350 words)

The method achieves excitation acceleration and profile control simultaneously by exploiting a parallel excitation architecture. It emphasizes pulsing multiple transmit elements in a coordinated way to effect appropriate B1 spatiotemporal variations, as opposed to the traditional practice of arranging B1 temporal variations only. Compared to an earlier approach (RD30016), the present invention represents significant improvements in several aspects. The pulsing method in particular is much enhanced in terms of applicability. It accommodates mutual coupling between transmit elements and applies to an arbitrary transmit array geometry. As its central component, a newly developed pulse design method determines the pulsing with high efficiency, allowing fast definition/execution of RF excitation.

**BACKGROUND OF THE INVENTION**

Please describe the problem or requirement addressed by your invention.

(see attached letter)

How has this problem or requirement been addressed before?

(see attached letter)

Is this disclosure letter related to any GE disclosure letters, patent applications or issued patents?

YES

RD30016

Have you completed a prior art search? NO

Please list any relevant literature or patents of which you are aware.

**DETAILED DESCRIPTION OF THE INVENTION**

How does your invention work?

(see attached letter)

Describe the important features of your invention and explain how to use the invention to solve the problems described above.

(see attached letter)

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What advantages are provided by your invention?  
(see attached letter)

Has your invention been reduced to practice? NO

Briefly describe any efforts to make a prototype of your invention or to test your invention. Additionally, summarize the results of any related experiments and testing and highlight any results of particular significance.

Validness of the method has been confirmed both in computer simulations and phantom studies. A prototype parallel transmission system is to be built by the year end, when a full-fledged application of the invention will take place.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Please describe the significance of any pictures, drawings, graphs, diagrams, structures or figures and the type of picture along with the specific view or application to the invention.

N/A

#### CLAIMED INVENTION

Please identify novel aspects that should be protected within this disclosure letter.

Accommodation of mutual coupling between transmit elements. Applicability to an arbitrary transmit array geometry. A pulse design method that determines the pulsing with high efficiency and allows fast definition/execution of RF excitation.

#### ATTACHED FILES

fast excitation disclosure.doc

DUTY OF DISCLOSURE	
a.	Have steps been taken to put into use, either outside GE or in our own operations?
b.	Has the invention or a product embodying or using it been sold or offered for sale?
c.	If the invention pertains to a process, have any steps been taken to employ the process commercially (e.g., for product production)?
d.	Has the invention been described in an electronic or printed publication?
e.	Has the invention been described to persons who are not employees of GE?
f.	Are there results available of a prior art search pertaining to this invention?

g.	Has anyone else associated with the project within GE (marketing, sales, sourcing, etc.) disclosed the invention or offered the invention for sale?	No
h.	If you answered Questions a-g as "NO", is any use, sale, publication, or disclosure of the invention now contemplated?	Yes
! = Answer changed from Yes to No		

**Steps Taken to Put the Invention into Use or Employ the Process Commercially?**

**Describe circumstances(e.g. product name, production of product, use of product or prototype)**

**Who? Name of contact person**

**Where? Company Name/ GE Technology Area**

**Country**

**When? approximate Date**

**Sold or Offered for Sale?**

**Describe nature of transaction**

**To Whom?**

**By Whom?**

**Where?**

**When?**

**Described in Electronic or Printed Publication, or Disclosed in a Talk or Paper Presented at a Public Meeting**

**To Whom?**

**By Whom?**

**Within GE or Outside GE?**

**Where? Journal/Meeting/Country**

**When?**

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<b>CO-INVENTORS</b>					
Name	Address	Global Tech. Center	Lab	Citizenship	Reviewed
	[REDACTED]				

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*Yudong Zhu	[REDACTED]	Imaging Technology (5300)	MRI Lab	P.R. China	Yes
'Lead co-inventor					

**Primary / Financing Business (or Advanced Technology Program) : GE Medical Systems**

**Primary / Financing Component : MR**

**Associated Lab/Program : Imaging Technology (5300)/MRI Lab**

**Assigned Attorney : John Thompson**

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